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Examiner: MORTARI, Graziano
Group A.U.: 1725

Remarks

The assertions of the Examiner, as set forth in the outstanding Final Office Action under par. **a**, **b**, **c** and **d**, are respectfully traversed for the following reasons.

I.

Failure of the prior art to disclose the particular features **a-d** has been implicitly acknowledged by the Examiner alleging that features **a**, **c** and **d** would be obtainable by the skilled person through combinations of partial features allegedly available from the cited prior art.

Complete failure of the cited prior art to disclose feature **b** (**supporting and guide element for the piston that is arranged separate from...**), as indicated by the applicant in his previous letter of 11.24. 2003, has also been implicitly acknowledged by the Examiner inasmuch as feature **b** has not been mentioned or discussed in the outstanding Final Office Action.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka* , 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

II.

In the rejections set forth in the outstanding Office Action and related rationale regarding the combination of **partial features**, where such partial features exist, that allegedly would lead to the features **a-d**, there is **no indication of where** in the cited prior art motivation or suggestion or at least desirability to arrive at the alleged **combined features**, and not only to a **mere, puzzle-like addition of the partial feature** indicated, so as to arrive at what is

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claimed is provided.

Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." 916 F.2d at 682, 16 USPQ2d at 1432.). See also In re Fritch, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992)

and

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)

III.

The factual lack of motivation or desirability in the cited prior art for the modifications and combinations indicated in the Office Action is a clear indication that the rationale supporting the alleged combinations, allegedly leading to features **a-d**, is in fact based on hindsight.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

IV.

Although applicant has traversed the rejections set forth in the Office Action of 03.25.2003, indicating in the prior letter of 11.24.2003 that modification of the basic prior art to Behrens regarding pressure injection under protective gas film, in view of Cook regarding injection in a vacuum surrounding, would change the intended purpose and the principle of operation of the prior art invention (see page 8, par. 4 of the letter of 11.24.2003) and that there are technical incompatibilities between Behrens and Cook that would render impossible the combination asserted in the previous

Office Action without substantial reconstruction (see page 7, last par. of the letter of 11.24.2003), such issues and the substance thereof have not been considered and answered by the Examiner, as requested in MPEP 707.07(f), particularly in view of the fact that the Office Action was made Final.

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959); ("suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." 270 F.2d at 813, 123 USPQ at 352.)

Now, in particular

a) The feature:

*one second opening for injecting in and, respectively,
aspirating protecting gas from the containment chamber*

It is an objective fact that such feature is nowhere taught or suggested in the cited prior art.

Behrens teaches exclusively a molten metal pressure feeding for filling an inert gas flushed chamber 13 -where the air is vented through vents in the mold-, in which the inert gas is pressure fed through a one way opening 16 into the chamber 13 under pressure higher than the atmospheric pressure (positive flow), and a molten metal injection all

under a protective gas film (see column 2, lines 37-52, column 4, lines 1-16) .

Contrary to Behrens, Cook teaches molten metal feeding and filling of a shot sleeve/chamber 26 in a vacuum atmosphere, wherein the chamber 26 is permanently maintained in a closed vacuum housing that accommodates the pouring ladle 16. The shot sleeve, at least at its open, exposed feeding part 30 is sealingly accommodated in the vacuum space 16 and has no gas opening in its wall, such wall being only provided with a one port 30 for the pouring of the metal from a ladle 38. (see column 3, lines 21-27: “*..device 19 and the injection device are completely separated...*”). Thus, Cook completely fails to teach or suggest gas feeding and/or venting openings on the shot sleeve/chamber 26, only the surrounding closed housing (vacuum chamber 16) having gas/vacuum connections 18-19.

Behrens addresses the problem of delivering molten metal from remote locations in pipes to the shot mechanism. (see column 1, lines 32-35)

Cook deals with the problem of the clogging of the fill tubes and teaches as a solution elimination of such tubes. (see column 1, lines 36-40)

Thus, Behrens and Cook convey divergent, contradictory teachings to the person with ordinary skills in the art.

In view of the context of Behrens and Cook, of their diverging teachings and of the different techniques disclosed therein (pressure injection under protective gas film with air venting through the mold and injection chamber accommodated along with the ladle in a vacuum housing, respectively) the person skilled in the art would lack any suggestion, motivation or desire to modify Behrens for gas

aspiration through the pressure gas inlet opening thereof.

Provision of a sole opening for removal of inert gas (vacuum creation), in the context of the pressure feeding and injection under gas film protection as taught by Behrens, not only is contrary to the whole teaching of the document, but it would be technically impossible or at least incompatible with the technique disclosed by the document without substantial reconstruction and redesign of the elements as claimed and shown.

Evacuation of protective gas through the protective gas in-feed opening 16 of Behrens, following to basic principles of the physics, would trigger outflow of the molten metal that is fed under pressure through the gas insertion opening 15.

Modifications for gas venting in the basic prior art of Behrens not only would require substantial reconstruction but it would change the principle of the whole operation of the pressure device taught therein, making it unsatisfactory for the intended purpose, since it would deprive the molten metal of its pressurized protective gas film and transforming the process in a vacuum injection.

It will be noted that the claimed invention is directed to combined pressure-vacuum injection (double purpose gas opening in claim 11 and protective gas introduction with subsequent gas aspiration step in claim 20).

In view of the above objective facts, in particular on the complete lack of disclosure or suggestion of the partial feature "*aspiration opening on the injection chamber wall*" and of an objective show of desirability in the cited prior art for the combination put forth by the Examiner, it is respectfully submitted that the rationale for combination under par. a):

"It would have been obvious to remove the inert gas of Behrens after it flush the mold cavity in view of Cook."

cannot be accepted since it appears based on clear hindsight reasoning.

Last but not least, the assertion of the Examiner that "use of a single opening for injecting and suctioning...solves no stated problem..." cannot be either accepted.

The double function opening allows to feed the metal and to perform at least part of the injection under pressurized gas protection, while the last part of the injection is performed under vacuum created, unlike in Cook, directly in the injection chamber (see pages 4-5, lines 20-30 and 1-10).

The related problem/objects solved is/are clearly set forth at page 2, lines 20-23 of the specification.

The provision of a single-dual function hole further to providing the mixed injection mentioned above allows simplification and speeding up of the device and related operation, respectively, such as to make the claimed device suitable for high die filling rate (for thin-walled die casting) in addition to its capacity for the low die filling rate (for thick walled die-casting). (see page 5, lines 11-14 of the specification as filed)

b) The feature:

a supporting and guide element for the piston that is arranged separate from the containment chamber;

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It is an objective fact that such a feature is nowhere disclosed in the cited prior art.

The Examiner has not commented on such feature, implicitly acknowledging complete failure of the cited prior art to disclose or suggest it.

The arrangement with the support 21 detached from the chamber end allows to both provide support and guided centering for the (head of the) rapidly movable piston 19 while in its retracted position and, at the same time, support and guidance for the wiping/lubricating means 22, 23 during the pre-injection operation of the piston and while the means 22, 23 clean and lubricate the whole piston surface 19. (see page 4, lines 6-8 of the specification as filed)

The Examiner only asserts that Rearwin teaches wiping means and French '198 a lubricating means but neglects completely such feature **b**, *ipso facto* acknowledging complete failure of the cited prior art to disclose it.

In fact nowhere in Rearwin or French '198 or any other of the cited prior art a support as claimed is taught or suggested, or the desirability to provide such a support is expressed.

Rearwin discloses wiping means 161 that are located so as to be part of the end sealing element 112 of the rear end of the injection chamber and accordingly may act only on a limited rear part of the piston head 92 (see figures 1 and 3).

French '198 teaches, in a **cold chamber** (chambre froide)

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injection system a greasing ring 4 embedded in the wall of the injection chamber 3 at 3-4 mm away from the end of the filling opening 2, and within the very extension of the injection chamber (page 2, right column, lines 18-20)

Thus, neither Rearwin nor French '189 discloses or suggests the claimed support of the applicant.

c) The feature:

cleaning and lubricating means arranged in order of operation on said supporting element;

It is an objective fact that none of the cited documents teaches a **combination of both a cleaning and a lubricating means that are arranged in order of operation** (on a guiding/supporting element for the ram).

The Examiner states at page 4, lines 4-8, under par. b) that "It would have been obvious to arrangement the lubricating means of French...such that the ram in the element 112 can be lubricated after the surface thereof had been cleaned".

In Rearwin the end sealing element 112 that acts as a vacuum sealing end for the injection chamber comprises a vacuum chamber 114 in which only a wiping element 162 is provided that wipes the ram. Rearwin shows that **it is sufficient, in order to avoid scoring of the chamber walls, to wipe the ram surface.** Nowhere it is disclosed or suggested or at least the desirability of an additional greasing of the piston, let alone for a specific arrangement of a combined wiping-

lubrication system.

French '198 deals with the problem of the grease safe feeding (*solution satisfaisante pour une alimentation sûre*) in automatic pressure greasing of a piston, as a progress over the manual greasing thereof that would require a disadvantageous extraction of the piston from the injection chamber (page 1, right column, lines 20-26: *sort à l'exterieur du front de la chambre de pression*).

As a solution, in French '198 at the end of the aperture of the injection chamber **only a pressure (15-50 at. or 200 at.) greasing element 4-5** is provided.

There is no teaching for wiping the piston nor any desirability to do it in addition to greasing and moreover in a specific configuration.

Thus neither in Rearwin nor in French '198 an incentive for the **combination** wiping-lubrication and for the construction of the combination with a **specific arrangement** is provided.

A statement that modifications of the prior art to meet the claimed invention would have been "" well within the ordinary skill of the art at the time the claimed invention was made"" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).

Provision of the wiping element 162 **in a vacuum sealing chamber** teaches away from, and is **technically incompatible** with the provision of the **pressure acting greasing element of French '198**.

It thus an objective fact that, nowhere in the cited prior art, in particular in Behrens or

Cook or Rearwin or French '198, there is some implicit or explicit reason, suggestion or motivation for the person of ordinary skills in the art having no knowledge of the claimed invention to modify Behrens by adding a wiper and a lubricator and arranging them in the order of operation.

Therefore the rationale put forth by the Examiner regarding the obviousness of the combination cannot be accepted since it appears based on hindsight reasoning.

d) The feature:

so as to provide cleaning and lubricating on the whole external surface of the piston ..."

The Examiner states under par. c) that the drawing of Rearwin does not necessarily show the entire process step.

However the Examiner did not mentioned **what particular part** from the process step disclosed in the specification of Rearwin the drawing **does not show** which may teach or suggest a complete wiping of the surface of the ram, **particularly such as to prepare the ram clean for lubricant application over its entire surface.**

Rearwin only coherently teaches and shows a vacuum end sealing element 112 for the chamber 20 that has a wiper 162 and no other means, such as the piston guiding and wiper-lubricator support located away from the chamber end as claimed in feature b mentioned above.

Since the other independent claims 18 and 20 and the claims dependent thereon, pending in the application, contain or include at least the limitations or method steps corresponding to the limitations of claim 11, and in view of the comments above (regarding features a-d), the facts and conclusions of non-obviousness set forth apply to all

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of them too.

In view of the objective facts and arguments indicated in the foregoing, it is respectfully requested that the rejection of the claims as based on 35 USC 103(a) be withdrawn and the claims 11-20 be allowed.

While it is believed that the amended claims properly and clearly define the present invention, applicant would be open to any suggestion or amendment the Examiner may have or propose concerning different claim phraseology which, in the Examiner's opinion, more accurately defines the present invention.

Respectfully submitted,



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